



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/986,134	11/07/2001	Rodolfo Antonio Gomez	545/50645	4659
23911	7590	11/28/2003	EXAMINER	
CROWELL & MORING LLP INTELLECTUAL PROPERTY GROUP P.O. BOX 14300 WASHINGTON, DC 20044-4300			WILKINS III, HARRY D	
			ART UNIT	PAPER NUMBER
			1742	

DATE MAILED: 11/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/986,134

Applicant(s)

GOMEZ, RODOLFO ANTONIO

Examiner

Harry D Wilkins, III

Art Unit

1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

1. The objection to claim 11 is withdrawn in view of Applicant's cancellation of that claim.
2. The rejection of claim 5 under 35 USC 112, 2<sup>nd</sup> paragraph has been withdrawn in view of Applicant's remarks.
3. The rejections under 35 USC 102 based on either Gomez or Mazanec et al have been withdrawn in view of Applicant's amendment to the claims.

***Specification***

4. The disclosure is objected to because of the following informalities: on page 7, references '12' and '14' have been switched (i.e.-'12' in the drawing is the electrical connection with the inner electrode and '14' is the electrical connection with the outer electrode. Appropriate correction is required.
5. It appears that Applicant intended to amend the specification by switching reference to numerals '12' and '14', but inadvertently left this amendment out of the response. Any response to this action should include the designated amendment.

***Claim Objections***

6. Claim 9 is objected to because of the following informalities: in the amended claim, several portions of the original claim were omitted, including (in line 2) between "the" and "cylindrical", "compound electrode includes a" was left out, and (in line 2) "outer" should be "inner". Also, in line 7, "surround" should be "surrounding". Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 9 and 10 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The claim limitation in claim 9, that the outer electrical conductor electrode encloses at least one end of the inner electrode is not supported by the specification. In particular, see figure 5 of the drawings and the description in the specification at the paragraph spanning pages 4 and 5 and page 9, line 29 to page 10, line 11. The basic description does not teach that in this alternative embodiment, the outer electrode encloses at least one end of the inner electrode. In fact, the specification, particularly in figure 5, teaches the direct opposite. It also seems that the arrangement where the *cylindrical* outer electrode completely encloses at least one end of the *cylindrical* inner electrode is physically impossible, as one cylinder cannot enclose another cylinder.

***Double Patenting***

9. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA

1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

10. Claims 1-6 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 3, 16 and 19 of U.S. Patent No. 6,475,653 in view of Takahashi (US 4,515,674) (for claims 1-6), Meyers et al (for claims 2 and 3) and Applicant's admission of prior art (for claim 5). Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of '653 teach a compound (composite) electrode that has an inner electrical conductor and an outer electrical conductor with an electrically conductive material, an ionic or semiconductor membrane, sandwiched there between. However, the claims of '653 do not teach that the outer electrode encloses at least one end of the inner electrode. Takahashi teaches (see figures 4 and 5 and col. 10, lines 39-56) to completely envelop an inner electrode piece within an outer electrode piece. Takahashi teaches (see col. 2, lines 50-64) that the reason for this set-up is to prevent dissolution of the inner electrode piece. Therefore, it would have been obvious to one of ordinary skill in the art to have adapted the compound electrode of the claims of '653 to have the outer electrode piece completely enclose at least one end of the inner electrode piece as taught by Takahashi because doing so would prevent the inner electrode piece from becoming dissolved in the electrolyte.

Regarding claims 2 and 3, the claims of '653 do not teach that the sandwiched electrically conductive material is a gel or liquid. However, Meyers et al teach (see col. 1, line 56 to col. 2, lines 40) that a gel electrolyte is used to replace solid or liquid electrolytes because it has higher conductivity and stability. Meyers et al also teach (see col. 1, line 64 to col. 2, line 19) that liquid electrolytes were used to replace solids because of increased conductivity over the solid electrolytes. Therefore, it would have been obvious to one of ordinary skill in the art to have substituted a liquid or gel electrolyte for the solid electrolyte of Gomez and Takahashi because Meyers et al teach that the liquid and gel electrolytes have higher conductivities, thus allowing for a higher rate of power transfer (through lower resistance).

Regarding claim 4, claim 3 of '653 recites that the sandwiched material is an ionic or semiconductor membrane.

Regarding claim 5, the claims of '653 are silent as to a high specific surface area being formed on the outer surface of the outer electrode. However, Applicant admitted as prior art, see remarks filed 6 October 2003 at pages 10-11, that high specific surface area electrodes were well known in the prior art, and were used to increase the reaction rate of the electrochemical reaction and to reduce the energy consumption rate. Therefore, it would have been obvious to one of ordinary skill in the art to have applied a high specific surface area surface as taught by Applicant's admission to the outer surface of the outer electrode of Gomez in view of Takahashi in order to increase the reaction rate and to reduce the energy consumption rate.

Regarding claim 6, claim 1 of '653 states that the outside of the electrodes are coated with a catalyst.

***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 1, 4, 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gomez (WO 99/12220) in view of Takahashi (US 4,515,674).

Gomez teaches (see page 11, lines 7-18 and figure 2) a composite electrode that has an inner electrical conductor 7, contained in an outer electrical conductor 5. There between is sandwiched an electrically conducting material 6, such as an ionic or semiconductor membrane. There are electrical leads 9 and 8 to the inner and outer electrodes, respectively.

Gomez does not teach that the outer electrode encloses at least one end of the inner electrode.

However, Takahashi teaches (see figures 4 and 5 and col. 10, lines 39-56) to completely envelop an inner electrode piece within an outer electrode piece. Takahashi teaches (see col. 2, lines 50-64) that the reason for this set-up is to prevent dissolution of the inner electrode piece.

Therefore, it would have been obvious to one of ordinary skill in the art to have adapted the composite electrode of Gomez to have the outer electrode piece

completely enclose at least one end of the inner electrode piece as taught by Takahashi because doing so would prevent the inner electrode piece from becoming dissolved in the electrolyte.

Regarding claim 4, Gomez teaches (see page 11, lines 12-13) that the sandwiched material 6 is an ionic or semiconductor membrane.

Regarding claim 6, Gomez teaches (see page 11, line 8) that the outside of the electrode is coated with a catalyst 4.

Regarding claim 7, Gomez teaches (see figure 4 and the paragraph spanning pages 11 and 12) an electrochemical cell having an anode cell 22 and a cathode cell 16, each with an electrode 17, which may be the composite electrode described above. The electrochemical cell has a DC power source 21 connected to the second ends of the two electrodes (due to the direction of flow of electrons, the cathode cell must necessarily be attached to the negative terminal and the anode cell to the positive terminal). The second ends (B in figure 2) are attached to the outer electrode. The first ends (i.e.-inner electrodes) of the electrodes are electrically connected to each other, and the cell contains means to deliver electrolyte to the anode cell and means 18 to transfer the discharge of the anode cell to the cathode cell and means 19 to transfer the discharge of the cathode cell to the anode cell.

13. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gomez in view of Takahashi as applied above to claims 1, 4, 6 and 7 and further in view of Meyers et al (US 3,708,220).



Art Unit: 1742

The teachings of Gomez and Takahashi are described above in paragraph no. 12.

Gomez and Takahashi do not teach that the sandwiched electrically conductive material is a gel or liquid.

Meyers et al teach (see col. 1, line 56 to col. 2, lines 40) that a gel electrolyte is used to replace solid or liquid electrolytes because it has higher conductivity and stability. Meyers et al also teach (see col. 1, line 64 to col. 2, line 19) that liquid electrolytes were used to replace solids because of increased conductivity over the solid electrolytes.

Therefore, it would have been obvious to one of ordinary skill in the art to have substituted a liquid or gel electrolyte for the solid electrolyte of Gomez and Takahashi because Meyers et al teach that the liquid and gel electrolytes have higher conductivities, thus allowing for a higher rate of power transfer (through lower resistance).

14. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gomez in view of Takahashi as applied to claims 1, 4, 6 and 7 above, and further in view of Applicant's admission of prior art.

The teachings of Gomez and Takahashi are described above in paragraph no. 12.

Gomez in view of Takahashi do not teach that the outer surface of the outer electrode has "a high specific surface area" as claimed.

However, Applicant admitted as prior art, see remarks filed 6 October 2003 at pages 10-11, that high specific surface area electrodes were well known in the prior art, and were used to increase the reaction rate of the electrochemical reaction and to reduce the energy consumption rate.

Therefore, it would have been obvious to one of ordinary skill in the art to have applied a high specific surface area surface as taught by Applicant's admission to the outer surface of the outer electrode of Gomez in view of Takahashi in order to increase the reaction rate and to reduce the energy consumption rate.

15. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gomez in view of Takahashi as applied above to claims 1, 4, 6 and 7 and further in view of Mekjean et al (US 3,293,159).

The teachings of Gomez and Takahashi are described above in paragraph no. 12.

However, Gomez and Takahashi do not teach using the compound/composite electrode in a unipolar activation cell as claimed.

Mekjean et al teach (see Figure 1 and paragraph spanning cols. 5 and 6) an electrochemical apparatus with an anode cell 5, a cathode cell 6, a positive terminal of a DC power source being connected to the anode 3 and the negative terminal connected to the cathode 4, and means to supply and withdraw anolyte from the anode cell and means to supply and withdraw catholyte from the cathode cell.

Mekjean et al do not teach that the apparatus is of a unipolar type, however, it would have been obvious to one of ordinary skill in the art to have modified the

apparatus of Mekjean et al by separating the anode cell and cathode cell in order to produce charged anolyte and catholyte. See MPEP 2144.04.V.C and *In re Dulberg* 289 F.2d 522, 129 USPQ 348, 349 (CCPA 1961). It would have been obvious to one of ordinary skill in the art to have added means for completing the electrical circuit, such as by adding a wire connecting the two ends of the anode and cathode.

Therefore, it would have been obvious to one of ordinary skill in the art to have used the compound/composite electrode of Gomez in view of Takahashi in the electrochemical cell of Mekjean et al because the composite electrode provides the best power output (see Gomez at page 3, lines 11-14) for the disclosed electrode designs.

16. Claims 1, 4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mazanec et al (US 5,693,212) in view of Takahashi (US 4,515,674).

Mazanec et al teach (see Figs. 9 and 10 and col. 17, lines 27-46) a composite electrode with an inner electrode 52 and an outer electrode 53 with an electrically conductive material 51 sandwiched there between, with electrical leads 56 and 57 for inlet and outlet of electrons.

Mazanec et al do not teach that the outer electrode encloses at least one end of the inner electrode.

However, Takahashi teaches (see figures 4 and 5 and col. 10, lines 39-56) to completely envelop an inner electrode piece within an outer electrode piece. Takahashi teaches (see col. 2, lines 50-64) that the reason for this set-up is to prevent dissolution of the inner electrode piece.

Therefore, it would have been obvious to one of ordinary skill in the art to have adapted the composite electrode of Mazanec et al to have the outer electrode piece completely enclose at least one end of the inner electrode piece as taught by Takahashi because doing so would prevent the inner electrode piece from becoming dissolved in the electrolyte.

Regarding claim 4, Mazanec et al teach (see col. 17, lines 27-46) that the electrically conductive material was a multi-component membrane.

Regarding claim 6, Mazanec et al teach (see col. 17, lines 47-55) that a catalyst coating may be applied to the surface of the cathode (outer electrode).

17. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mazanec et al in view of Takahashi as applied above to claims 1, 4, 6, 9 and 10, and further in view of Meyers et al (US 3,708,220).

The teachings of Mazanec et al and Takahashi are described above in paragraph no. 16.

Mazanec et al and Takahashi do not teach that the sandwiched electrically conductive material is a gel or liquid.

Meyers et al teach (see col. 1, line 56 to col. 2, lines 40) that a gel electrolyte is used to replace solid or liquid electrolytes because it has higher conductivity and stability. Meyers et al also teach (see col. 1, line 64 to col. 2, line 19) that liquid electrolytes were used to replace solids because of increased conductivity over the solid electrolytes.

Therefore, it would have been obvious to one of ordinary skill in the art to have substituted a liquid or gel electrolyte for the solid electrolyte of Mazanec et al and Takahashi because Meyers et al teach that the liquid and gel electrolytes have higher conductivities, thus allowing for a higher rate of power transfer (through lower resistance).

18. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mazanec et al in view of Takahashi as applied to claims 1, 4, 6, 9 and 10 above, and further in view of Applicant's admission of prior art.

The teachings of Mazanec et al and Takahashi are described above in paragraph no. 16.

Mazanec et al in view of Takahashi do not teach that the outer surface of the outer electrode has "a high specific surface area" as claimed.

However, Applicant admitted as prior art, see remarks filed 6 October 2003 at pages 10-11, that high specific surface area electrodes were well known in the prior art, and were used to increase the reaction rate of the electrochemical reaction and to reduce the energy consumption rate.

Therefore, it would have been obvious to one of ordinary skill in the art to have applied a high specific surface area surface as taught by Applicant's admission to the outer surface of the outer electrode of Mazanec et al in view of Takahashi in order to increase the reaction rate and to reduce the energy consumption rate.

***Response to Arguments***

19. Applicant's arguments filed 6 October 2003 have been fully considered but they are not persuasive. Applicant argued that:

- a. The claims of '653 do not teach the presently claimed invention;
- b. Gomez and Mazanec et al do not teach the now claimed limitation that the outer electrode encloses at least one end of the inner electrode; and,
- c. The apparatus of Mazanec et al is designed for use with high temperature gases, and would not function in the environment of the present invention.

In response to Applicant's first argument, claim 3 of '653 teaches the compound electrode as claimed, with the exception of the features noted in the rejection above. Thus, regardless of the final application (i.e.-fuel cell electrode), claims 1 and 3 of '652 teach the electrode substantially as claimed.

In response to Applicant's second argument, while this argument is true, it would have been obvious to have modified the electrodes of Gomez or Mazanec et al to have the outer electrode enclose at least one end of the inner electrode as taught by Takahashi to prevent the corrosion of the inner electrode.

In response to Applicant's third argument, it is noted that the features upon which applicant relies (i.e., the different electrolysis environment) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). All claim 1 recites is a compound electrode, and Mazanec et al teach such an electrode.

***Conclusion***

20. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D Wilkins, III whose telephone number is 703-305-9927. The examiner can normally be reached on M-Th 10:00am-8:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V King can be reached on 703-308-1146. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Application/Control Number: 09/986,134


Page 15

Art Unit: 1742

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Harry D Wilkins, III  
Examiner  
Art Unit 1742

hdw

ROY KING   
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700